

II. REMARKS

By the present paper, claims 1, 2, 11, 13, 14, 16-18, 21, 25 and 26 have been amended to improve grammar, punctuation, and/or clarity, and not for a reason related to patentability. Therefore, the amendment to claims 1, 2, 11, 13, 14, 16-18, 21, 25 and 26 has no further limiting effect on the scope of the claims.

No new matter has been added to the above-captioned application by the present amendment.

A. The Invention

The present invention pertains broadly to a sealant epoxy-resin molding material, such as may be used to seal electronic component devices. In accordance with an embodiment of the present invention, a sealant epoxy-resin molding material is provided that has features recited by independent claim 1. Various other embodiments, in accordance with the present invention, are recited by the dependent claims.

An advantage provided by the various embodiments, in accordance with the present invention, is that a sealant epoxy-resin molding material is provided that is flame retardant and that also has good characteristics with respect to moldability, reflow resistance, and moisture resistance, and that can undergo high-temperature storage. Another advantage provided by a sealant epoxy-resin molding material of the present invention is that the material is a non-halogenated, non-antimony containing flame retardant.

B. The Rejections

Claims 1-12, 18-20, 22-24 and 26 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Ikezawa et al. (U.S. Patent Application Publication No. US 2003/0201548, hereafter the "Ikezawa Publication") in view of Nakamura et al. (JP 05-283560, hereafter the

“Nakamura Document”). Claims 13-17, 21 and 25 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the Ikezawa Publication in view of the Nakamura Document, and further in view of Isshiki et al. (U.S. Patent 6,040,395, hereafter the “Isshiki Patent”) and “applicant’s submission” (Applicants’ specification, page 33, hereafter “Applicants’ Allegedly Admitted Prior Art” or “AAAPA”).

Applicants respectfully traverse the Examiner’s rejections and request reconsideration of the above-captioned application for the following reasons.

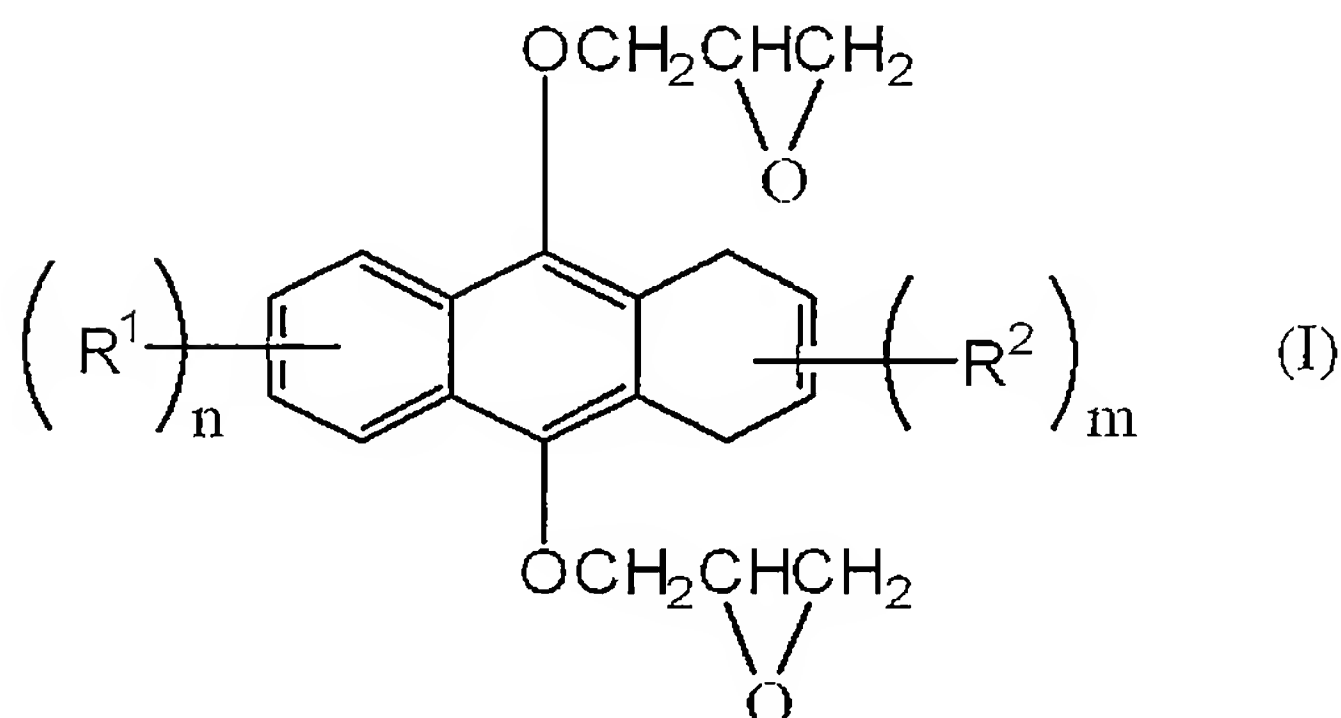
C. Applicants’ Arguments

A prima facie case of obviousness requires a showing that the scope and content of the prior art teaches each and every element of the claimed invention, and that the prior art provides some teaching, suggestion or motivation, or other legitimate reason, for combining the references in the manner claimed. KSR International Co. v. Teleflex Inc., 127 S.Ct. 1727, 1739-41 (2007); In re Oetiker, 24 U.S.P.Q.2d 1443 (Fed. Cir. 1992). In this case, the Examiner has failed to establish a prima facie case of obviousness against independent claim 1 because the combination of the Ikezawa Publication, the Nakamura Document, the Isshiki Patent, and the AAAPA fails to teach each and every limitation of claim 1.

i. The Ikezawa Publication

The Ikezawa Publication discloses “epoxy resin molding material for sealing,” wherein the encapsulating epoxy resin molding material comprises: (A) an epoxy resin, (B) a curing agent, and (C) a silane coupling agent having a secondary amino group or (D) a phosphate, and semiconductor devices encapsulated therein (See Abstract of the Ikezawa Publication). While the Ikezawa Publication discloses in ¶ [0070] a list of epoxy resins suitable for use as component (A) of Ikezawa’s encapsulating epoxy resin molding material,

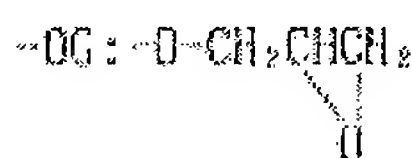
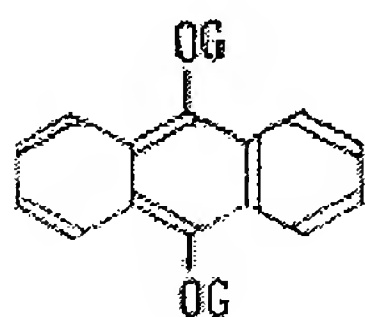
the Examiner admits that the Ikezawa Publication does not teach, or suggest, “the epoxy resin (A) contains a compound represented by the following General Formula (I):



wherein...n is an integer of 0 to 4...and m is an integer of 0 to 6” as recited by independent claim 1 (Office Action, dated August 13, 2008, at 5, lines 4-7). The Examiner also admits that the Ikezawa Publication does not teach, or suggest, “a silicon-containing polymer” as recited by claim 13 (Office Action, dated August 13, 2008, at 6, lines 8-10).

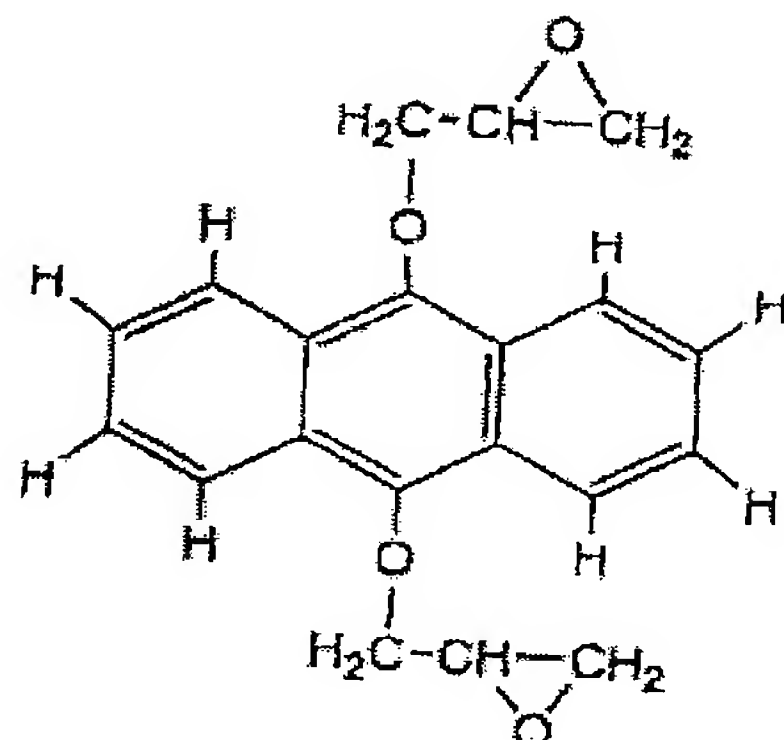
ii. The Nakamura Document

The Nakamura Document discloses an epoxy resin composition for semiconductor closure, wherein 9,10-dihydroxyanthracene is reacted with epichlorohydrin to produce a compound having the structural formula shown in Formula 9 below (Nakamura Document, ¶¶ [0001] and [0044], see also English Machine translation of the Nakamura Document, downloaded from Japanese Patent Office database on August 5, 2008, filed herewith as “Exhibit A”). A person of ordinary skill in the art would instantly realize that the compound

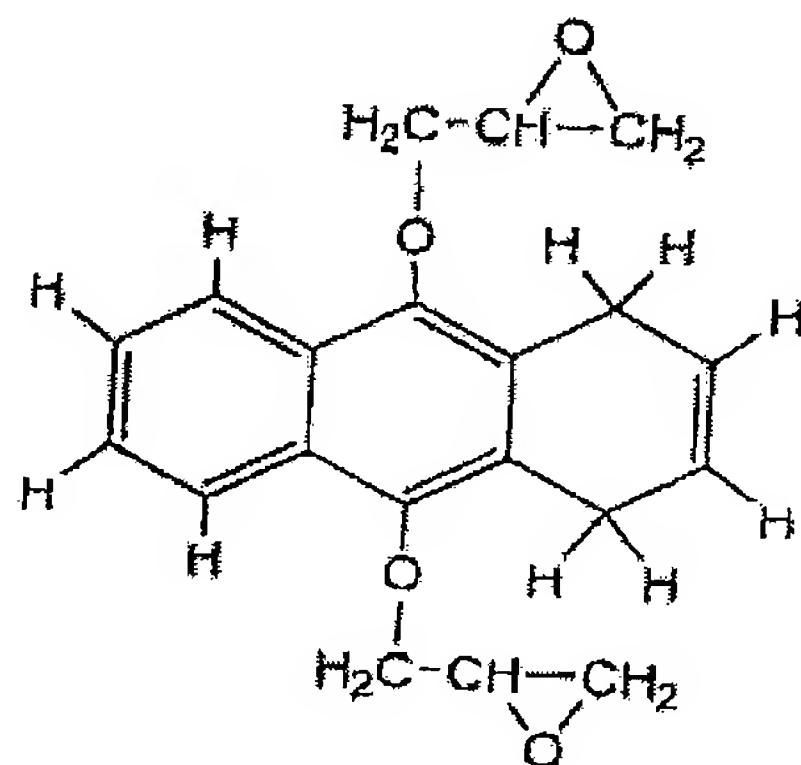


[Formula 9]

of Formula 9 corresponds to CAS Registry Number: 155665-67-1 (See, e.g., <http://stneasy-japan.cas.org/tmp/20031110/174338-1056700614-300/409740480.html>, downloaded on November 11, 2003, one page, filed herewith as "Exhibit B"), and has the chemical name 2,2'-[9,10-anthracenediylbis(oxymethylene)]bis-oxirane, and the following chemical structure:



A person of ordinary skill in the art would also instantly realize that a compound of General Formula (I), wherein $m = 0$ and $n = 0$, in accordance with Applicants' claimed invention, has the following structural formula:



A person of ordinary skill in the art would realize that this compound, employed in Applicants' invention, corresponds to CAS Registry Number: 848667-77-6 (See, e.g., STN Tokyo database search results, three pages, filed herewith as "Exhibit C"), which has the chemical name of 1,4-dihydro-9,10-anthracenediol, and which is a polymer with

(chloromethyl) oxirane. In other words, a person of ordinary skill in the art would instantly realize that the compound disclosed by the Nakamura Document as “Formula 9” is an anthracene compound that has its ring conjugated. A person of ordinary skill in the art would also instantly realize that the compound employed by the present invention, as recited by independent claim 1, is dehydrogenated at C₅ and C₈ and is a different compound form that of Nakamura’s “Formula 9.”

Thus, the fact is that the compound of Nakamura’s Formula 9 is a substantially different compound from that of General Formula (I) of the present invention as supported by the Chemical Abstracts Society’s (CAS) separate cataloguing of these compounds. It is an additional fact that these two substantially different compounds are synthesized differently. For example, the compound represented by General Formula (I) can be synthesized/manufactured with ease. The synthesis of a compound of Nakamura’s Formula 9 is more difficult because its precursor compound is unstable and easily oxidized. Consequently, it is difficult to manufacture the compound of Nakamura’s Formula 9 on an industrial level, although it is possible to synthesize the compound of Nakamura’s Formula 9 when performed on a smaller scale in a laboratory.

The fact that the compound of General Formula (I) may be synthesized in large amounts, whereas the compound of Nakamura’s Formula 9 must be synthesized in smaller batches due to the unstability of the precursor compound is additional evidence showing that the compound of General Formula (I) is not the same compound as that of Nakamura’s Formula 9.

However, these are not the only facts showing that Nakamura’s compound of Formula 9 is not the same compound as recited by claim 1 of the above-captioned application. The effect of the present invention is substantially different from that of Nakamura’s disclosure. As described in ¶ [0008] of Applicants’ original specification, a non-halogenated, non-

antimony sealant epoxy-resin molding material contains a compound of “General Formula (I),” and is superior in flame resistance while retaining desired properties with respect to moldability, reflow resistance, moisture resistance and high-temperature storage.

On the other hand, the Nakamura Document discloses that the epoxy resin disclosed therein contains an anthracene compound, as shown by Formula 9, and exhibits resistance to a temperature cycle test (“TCT”), and crack resistant characteristics (as noted by the Examiner). However, Nakamura’s objectives are substantially different ones from those of the presently claimed invention, which includes achieving flame resistance.

In addition, the Nakamura Document discloses that “[c]oupling agents, such as fire retardant, such as antimonous oxide and the phosphorous system compound, paints, a silane coupling agent, etc.” can be included in the epoxy resin composition (See Nakamura Document, ¶ [0029], and Exhibit A, ¶ [0029]). In other words, the Nakamura Document does not teach, or even suggest, the use of its anthracene compound as a flame retardant.

For all of the above reasons, Applicants have shown that the anthracene compound disclosed by the Nakamura Document as “Formula 9” is not the same compound as the compound of “General Formula (I)” recited by independent claim 1.

Furthermore, the Examiner admits that the Nakamura Document does not teach, or suggest, “a silicon-containing polymer” as recited by claim 13 (Office Action, dated August 13, 2008, at 6, lines 8-10).

iii. The Isshiki Patent

The Isshiki Patent discloses “electrical components and method for the fabrication thereof,” which pertains to a primer that improves adherence of a cured resin sealant to a cured silicone coating on an electrical element, wherein the primer is selected from the group consisting of: (i) a mixture of components (a) and (b), (ii) a reaction mixture of components

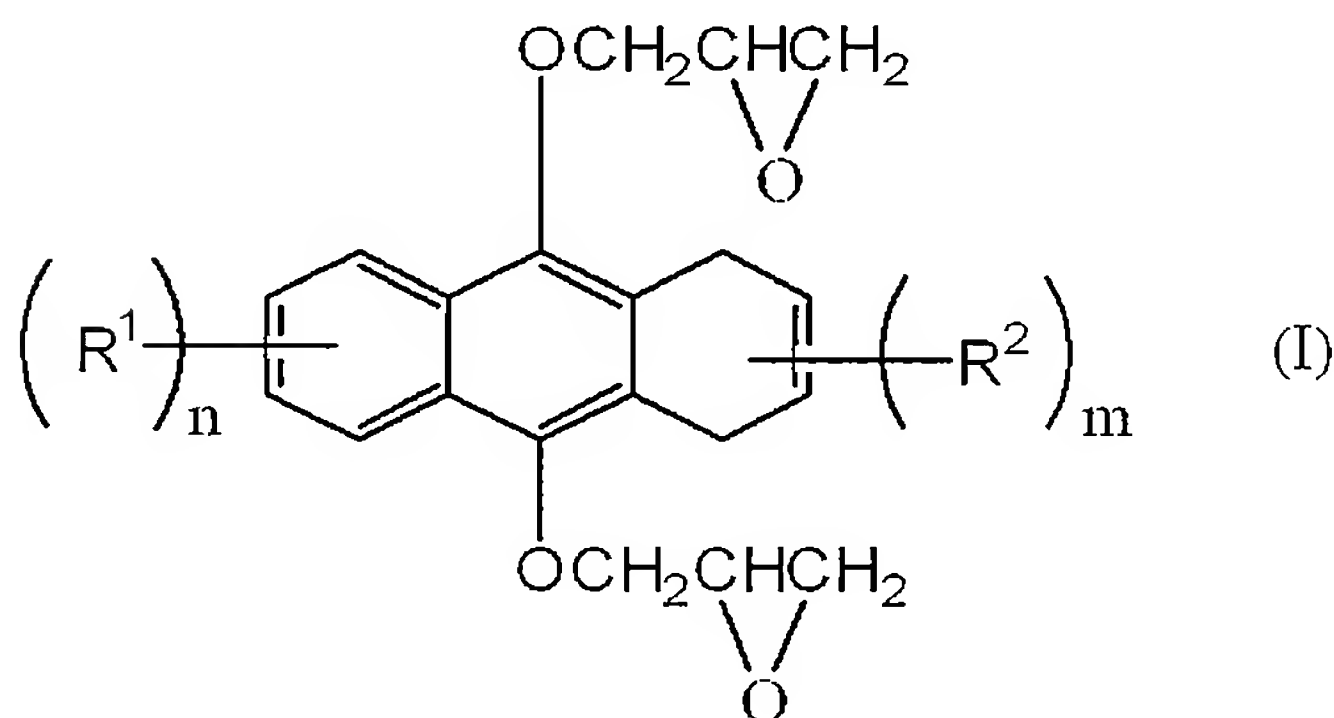
(a) and (b), (iii) component (c), (iv) component (c) and a mixture of components (a) and (b), and (v) component (c) and a reaction mixture of components (a) and (b), where component (a) is silanol-functional organopolysiloxane; component (b) is epoxy-functional organoalkoxysilane; and component (c) is organopolysiloxane with the average unit formula: $(R^1SiO_{3/2})_a(R^2_2SiO_{2/2})_b(R^2_3SiO_{1/2})_c(R^3O_{1/2})_d$ where R^1 is an epoxy-functional monovalent organic group; each R^2 is independently a monovalent hydrocarbon group, R^3 is selected from the group consisting of hydrogen and alkyl groups of 1 to 4 carbon atoms; a, b, and d are each a positive number; and c is 0 or a positive number (See Abstract of the Isshiki Patent).

iv. The AAAPA

The AAAPA is directed to “AY42-119,” a product disclosed on page 33 of Applicant’s specification as originally filed.

v. Summary of the Disclosures

The combination of the Ikezawa Publication, the Nakamura Document, the Isshiki Patent, and the AAAPA fails to teach, or even suggest, “the epoxy resin (A) contains a compound represented by the following General Formula (I):”



wherein...n is an integer of 0 to 4...and m is an integer of 0 to 6” as recited by independent claim 1.

For this reason, the Examiner has failed to establish a prima facie case of obviousness against claims 1-26 of the above-captioned application.

vi. No Legitimate Reason to Combine Disclosures and No Reasonable Expectation of Success If the Disclosure Were Combined

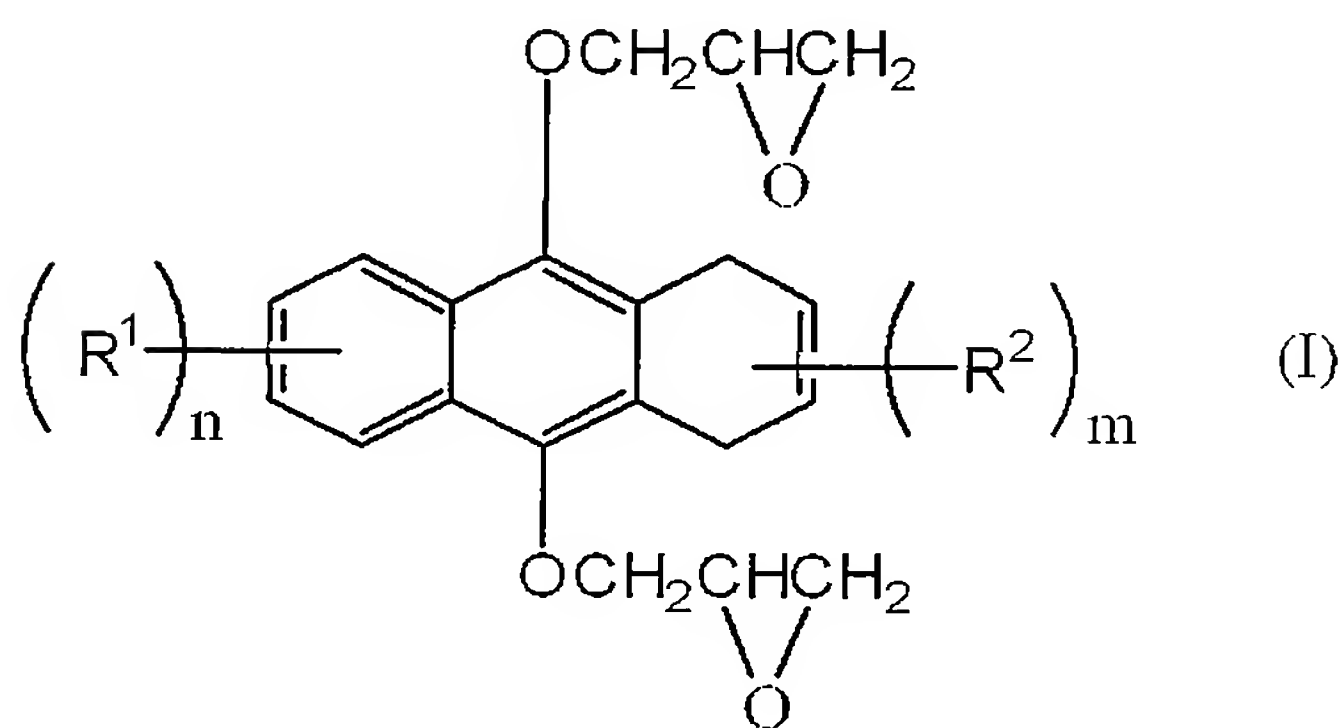
A proper rejection under Section 103 also requires showing (1) that a person of ordinary skill in the art would have had a legitimate reason to attempt to make the composition or device, or to carry out the claimed process, and (2) that the person of ordinary skill in the art would have had a reasonable expectation of success in doing so. PharmaStem Therapeutics, Inc. v. ViaCell, Inc., 491 F.3d 1342, 1360 (Fed. Cir. 2007). In this case, the Examiner has failed to establish both a legitimate reason to justify the combination of the Ikezawa Publication with the Nakamura Document, the Isshiki Patent and the AAAPA, and the Examiner has fail to demonstrate that a person of ordinary skill in the art would have had a reasonable expectation of success of arriving at Applicants’ claimed invention if the combination was made.

As discussed above, the Nakamura Document does not teach, or even suggest, the use of its anthracene compound as a flame retardant. Therefore, a person of ordinary skill in the art would have had no legitimate reason to employ the anthracene compound disclosed by the Nakamura Document in the resin molding material disclosed by the Ikezawa Publication. Furthermore, even assuming the Examiner had established a legitimate reason for making the combination (which is an invalid assumption), a person of ordinary skill in the art would have had no reasonable expectation of success of obtaining a “sealant epoxy-resin molding material” that has the properties exhibited by the sealant epoxy-resin molding material of

Applicants' claimed invention because the compound of Nakamura's "Formula 9" is a substantially different compound from that of "General Formula (I)" recited by independent claim 1.

III. CONCLUSION

The Examiner has failed to establish a prima facie case of obviousness against Applicants' claimed invention because neither the Ikezawa Publication, the Nakamura Document, the Isshiki Patent, nor the AAAPA, either alone or in combination, teach or suggest "the epoxy resin (A) contains a compound represented by the following General Formula (I):



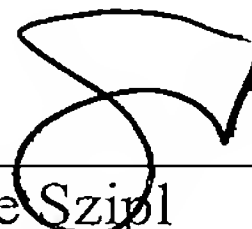
wherein...n is an integer of 0 to 4...and m is an integer of 0 to 6" as recited by independent claim 1. Thus, claim 1 is allowable. The remaining claims 2-26 each depend upon claim 1, either directly or indirectly, and are likewise allowable.

For all of the above reasons, claims 1-26 are in condition for allowance and a prompt notice of allowance is earnestly solicited.

Questions are welcomed by the below-signed attorney for Applicants.

Respectfully submitted,

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